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| APPLICATION NO.  | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|--|-------------|----------------------|---------------------|------------------|
| 10/072,579   | 02/06/2002  | Min-Goo Kim          | 678-804 (P10162)    | 1798             |
| 28249  | 7590        | 08/03/2006           | EXAMINER            |                  |
| DILWORTH & BARRESE, LLP<br>333 EARLE OVINGTON BLVD.<br>UNIONDALE, NY 11553 |             |                      | TORRES, JOSEPH D    |                  |
|  |             |                      | ART UNIT            | PAPER NUMBER     |
|  |             |                      | 2133                |                  |

DATE MAILED: 08/03/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

|                              |                        |                     |  |
|------------------------------|------------------------|---------------------|--|
| <b>Office Action Summary</b> | <b>Application No.</b> | <b>Applicant(s)</b> |  |
|                              | 10/072,579             | KIM ET AL.          |  |
|                              | <b>Examiner</b>        | <b>Art Unit</b>     |  |
|                              | Joseph D. Torres       | 2133                |  |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 21 June 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-3 and 5-7 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 1-3 is/are allowed.
- 6) ☒ Claim(s) 5-7 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 06 February 2002 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
- ☒ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## DETAILED ACTION

### *Introduction to Examiner's Response to Arguments*

#### 1. Fundamental Definitions:

The Examiner includes a reference, Lin et al. (Shu Lin & Daniel J. Costello, Error Control Coding Fundamentals and Applications, Prentice-Hall, 1983 pages 52-53 and 112-113) for the fundamental definitions provided below.

A code  $C$  is a  $k$ -dimensional subspace of a vector space  $F^n$  of all  $n$ -tuples where  $F$  is a finite field. Since any subspace of a vector space  $F^n$  is uniquely defined by a generating matrix  $G$ , i.e., rule, over the vector space  $F^k$  of all  $k$ -tuples, i.e.,  $G: F^k \rightarrow C$ ; the code  $C$  and the generating matrix  $G$  are used interchange in terms of the code  $C$  since they both represent the same code  $C$ . Simply put, a code  $C$  is a subset of a vector space  $F^n$  defined a linear transformation/rule  $G: F^k \rightarrow C$ . See page 52 of Lin for fundamental teachings.

The Authoritative Dictionary of IEEE Standards Terms defines code set as the complete set  $C$  of coded representations used by a particular code.

A subcode  $C_{\text{sub}}$  is a proper subset of a code  $C$ . See page 113 of Lin. Note a subcode is completely defined by the code  $C$  of which it is a proper subset and the method used to derive the subset  $C$ . For example, if  $M_1, M_2, \dots, M_m$  are puncturing matrices/rules for the respective subcodes  $C_{\text{sub-1}}, C_{\text{sub-2}}, \dots, C_{\text{sub-m}}$ , then  $M_1, M_2, \dots, M_m$  completely define the subcodes  $C_{\text{sub-1}}, C_{\text{sub-2}}, \dots, C_{\text{sub-m}}$ . Simply put, a subcode  $C_{\text{sub}}$  of a code  $C$  is defined by a rule  $M: C \rightarrow C_{\text{sub}}$ .

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The Applicant clearly uses subcode set to mean a set comprising sub-codes  $C_{\text{sub-1}}$ ,  $C_{\text{sub-2}}, \dots, C_{\text{sub-m}}$ , of a code  $C$ .

Subcode sets  $C_{\text{sub-1}}$ ,  $C_{\text{sub-2}}, \dots, C_{\text{sub-m}}$  of a code  $C$  are completely defined by respective rules  $M_1, M_2, \dots, M_m$  used to generate the subcodes  $C_{\text{sub-1}}$ ,  $C_{\text{sub-2}}, \dots, C_{\text{sub-m}}$  and for that reason any codes and subcode are generally identified by rules used to generate the subcode.

#### Definitions:

The Authoritative Dictionary of IEEE Standards Terms defines the term “set” as a kind of collection class with no duplicate members and where order is irrelevant. That is the set  $\{M_1, M_2, M_3, M_4, M_5\}$  is identical to the set  $\{M_3, M_1, M_5, M_2, M_4\}$ .

#### Claim interpretation:

Claims 1 and 6 recite: “generating sub-code sets with given code rates”. In the art, this is interpreted as generating a rule  $M$  for generating a subcode  $C_{\text{sub}}$  since the subcode itself is useless without the rule  $M$  and since codewords of the subcode  $C_{\text{sub}}$  are generated by applying the rule  $M$  for subcode. Hence the operation of generating the matrix/rule  $M$  for a subcode is sufficient for generating the subcode itself.

Claims 1 and 6 recite; “rearranging an order of the sub-codes in the sub-code sets”.

The Authoritative Dictionary of IEEE Standards Terms defines the term “set” as a kind of collection class with no duplicate members and where order is irrelevant. That is the set  $\{M_1, M_2, M_3, M_4, M_5\}$  is identical to the set  $\{M_3, M_1, M_5, M_2, M_4\}$ .

Claim 5 recites, "rearranging the matrixes in each new sub-code according to the priority". The Examiner assumes the Applicant intended: --rearranging the matrixes in each new sub-code set according to the priority-- otherwise the minor typographical error in the limitation makes no sense. The Authoritative Dictionary of IEEE Standards Terms defines the term "set" as a kind of collection class with no duplicate members and where order is irrelevant. That is the set  $\{M_1, M_2, M_3, M_4, M_5\}$  is identical to the set  $\{M_3, M_1, M_5, M_2, M_4\}$ .

Current rejection of claim 6:

Eroz teaches generating sub-code sets with given code rates (Figure 16(a) in Ero teaches a first 1/3 rate subcode set represent by puncturing matrices  $A=\{M_{a-1}, M_{a-2}, \dots, M_{a-7}\}$  and Figure 16(b) teaches as second 1/2 rate subcode set  $B=\{M_{b-1}, M_{b-2}, \dots, M_{b-4}\}$ ; Note: each of the generating matrices  $M_{x-i}$  is an exact representation of the subcode  $C_{x-i}$  that it generates; Note also that each of the subsets A and B are rate compatible sets, i.e., all of the subcodes for set A have the same rare, 1/3, and all of the subcodes for B have the sdame rate 1/2); rearranging an order of the sub-codes in the sub-code sets and storing the rearranged sub-codes (the subcode matrices  $A=\{M_{a-1}, M_{a-2}, \dots, M_{a-7}\}$  and set  $B=\{M_{b-1}, M_{b-2}, \dots, M_{b-4}\}$  are arranged sequentially in an ordered list starting with pattern 1; col. 3, lines 20-25 in Ero teaches the use of a puncturer, which is a device for storing puncturing matrices/rules; col. 13, lines 34-42 and Figure 20 in Ero teaches that patterns are selected to with the priority of optimizing the turbo encoder ); selecting a sub-code set with a code rate determined for transmission (col. 3, lines 14-25 in Ero);

and transmitting data using a sub-code in the selected sub-code set (col. 3, lines 14-25 in Eroz).

### ***Response to Arguments***

2. Applicant's arguments filed 06/21/2006 have been fully considered but they are not persuasive.

The Applicant contends, "none of Eroz and Gibbs discloses the concept of one sub-code set which are sub-codes having a code rate to be used after using the sub-code having a predetermined code rate; that Gibbs et al. deals with forward error correction, and nothing in Eroz et al. would ever suggest using processes dealing with forward error correction in its turbo encoder; that Gibbs et al. does not rearrange any codes, nor does Gibbs et al. rearrange any sub-codes; that the rearranging of Claim 1 is performed according to a priority of the sub-codes and Gibbs et al. teaches prioritizing segments of a data stream, not codes; and that Eroz et al. in Fig. 16 deals with puncturing patterns, not any codes themselves".

In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993). Claims 5 and 6 do not

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recite, "sub-codes having a code rate **to be used after using the sub-code having a predetermined code rate**" [Emphasis Added].

The Examiner disagrees with the applicant and maintains all rejections of claims 5-7.

All amendments and arguments by the applicant have been considered. It is the Examiner's conclusion that claims 5-7 are not patentably distinct or non-obvious over the prior art of record in view of the references, Ero; Mustafa et al. (US 6370669 B1, hereafter referred to as Ero) and Gibbs; Jonathan A. et al. (US 6711182 B1, hereafter referred to as Gibbs) in view of Mousley; Timothy J. (US 6671851 B1) as applied in the last office action, filed 01/18/2006. Therefore, the rejection is maintained.

3. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ero; Mustafa et al. (US 6370669 B1, hereafter referred to as Ero) and Gibbs; Jonathan A. et al. (US 6711182 B1, hereafter referred to as Gibbs) in view of Mousley; Timothy J. (US 6671851 B1).

See the Non-Final Action filed 01/18/2006 for detailed action of prior rejections.

4. Claims 6 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ero; Mustafa et al. (US 6370669 B1, hereafter referred to as Ero) in view of Gibbs; Jonathan A. et al. (US 6711182 B1, hereafter referred to as Gibbs).

See the Non-Final Action filed 01/18/2006 for detailed action of prior rejections.

***Allowable Subject Matter***

5. Claims 1-3 are allowed.

***Conclusion***

6. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Joseph D. Torres whose telephone number is (571) 272-3829. The examiner can normally be reached on M-F 8-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Albert Decady can be reached on (571) 272-3819. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.



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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

JOSEPH TORRES  
PRIMARY EXAMINER  
JOSEPH TORRES  
PRIMARY EXAMINER

Joseph D. Torres, PhD  
Primary Examiner  
Art Unit 2133